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it is representative of Spinoza to say that an infant's cry of pain is a free act in any degree whatsoever (see p. 41). Intelligence in the broad sense of the term rather than tendency seems to explain Spinozistic freedom, and for this reason Mr. Joachim, to whom Mr. Dunham expresses his indebtedness, is better fitted on account of his own idealistic and logical point of view to translate the philosophy of Spinoza into terms of modern philosophy.

KATHERINE E. GILBERT.

Man an Adaptive Mechanism. By GEORGE W. CRILE. New York, The Macmillan Company, 1916.—pp. xvi, 387.

Most investigators into the nature of life have worked with it in its simpler manifestations. Dr. Crile argues for the mechanistic interpretation of *man*, and uses evidence from the study of man. A surgeon and medical investigator of great powers and definite achievements, he erects into a general philosophic position his working hypothesis in attacking his own problems, and his results are his arguments. The character and strength of his appeal to the reader will depend much upon the latter's estimate of the force and relevancy of such logic in such a cause. If disposed to regard scientific creeds as merely such hypotheses, to be weighed by their utility, he will find the reasoning conclusive—unless perchance he happens to be concerned with different problems, where the particular hypothesis seems less serviceable. Right here, perhaps, is the proverbial 'rub.' Though no one can well be indifferent to the problems of preventive medicine, it is possible that there are other questions in the domain of human life which we should like also to ask. Thus there may still be ground for pause before accepting the adaptive mechanism view of man as the only, and universally sufficient, interpretation. But the author's interest is naturally in his own problems, and from his own standpoint we may survey his principal conclusions.

Life is a physico-chemical process; the Darwinian terminology relative to adaptation is used 'for convenience,' but with the stipulation that the notion of 'struggle' must be eliminated. The "old, arbitrary division of organic processes into 'physical' and 'psychical'" is also repudiated,—by placing all in the first division. The problem of consciousness is thus side-tracked rather than solved. The human body is an energy transforming machine, of which the essential parts are the brain, adrenals, liver, thyroid and muscles,—the "kinetic System." The initial spark comes from the brain; the adrenals contribute a secretion which mobilizes the parts for the respective functions and makes the energy transformation possible; the liver is the chief fabricator and storehouse of the fuel, and plays a large rôle in the neutralization of the acid end products of the change for elimination; the muscles are the motor, proper, and the thyroid the organ of speed control.

The foundation for this general view is laid in Dr. Crile's famous researches into surgical shock. Thousands of experiments were conducted on the physical nature of fear and pain and their effects in exhausting the tissues of the organs of the kinetic system. It was found that ordinary inhalation anaesthesia does not prevent or reduce these destructive effects, and that a large proportion of deaths from operations are due to such tissue (especially brain) exhaustion from trauma. By developing a special operative technique, including the substitution of nitrous-oxide oxygen for ether, the use of suggestion (anociation) and sedatives, and especially by blocking the nerve paths from the cutting point to the brain by means of local anaesthesia, Dr. Crile and his staff greatly reduced mortality and unpleasant after-effects from many kinds of operations. (The emphasis on suggestion is somewhat striking, though not necessarily inconsistent with the general viewpoint).

The kinetic theory also throws light upon the nature and treatment of the degenerative diseases, such as Graves's disease, Bright's disease, etc., essentially phenomena of breakdown from excessive activation. Many interesting applications of the theory are made to other vital problems, such as growth, the effects of drugs, emotional expression, the cause of death, etc. Mention should be made of the numerous remarkable illustrations from photomicrographs of histological preparations. Though the work is distinctly one to be read through rather than used for reference, it is provided with a very complete index.

F. H. KNIGHT.

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Artificial Parthenogenesis and Fertilization. By JACQUES LOEB. Chicago, The University of Chicago Press, 1913.—pp. viii, 312.

The author here gives to the public a revision by himself of the English translation of his German work, *Die chemische Entwicklungserregung des tierischen Eies*, published in 1909. The book includes a very full history to date of the investigations in this field, in which the author has taken so large a part, a description of the leading experiments, and a discussion of the conclusions which seem deducible from them as to the nature of the physico-chemical processes underlying (or constituting) vital changes. The mechanistic view of life is assumed throughout, rather than specifically argued for. The 'general reader' will find both a more comprehensive discussion of the author's general position in biology, and a more satisfactory presentation of the problems and achieved results in this particular field, in Dr. Loeb's earlier book on *The Mechanistic Conception of Life.*

The conclusions regarded as established, mainly by Dr. Loeb's own investigations into the fertilization of sea-urchin eggs, are briefly as follows: The action of the spermatozöon on the egg is of two distinct and separable kinds, the stimulation of its development, and the transmission to it of the paternal hereditary characters. Only the first of these has been successfully investigated. The action causing the development of the egg is again accomplished by two agencies whose effects have been experimentally separated. The first causes the formation of the 'fertilization membrane,' which seems to be the essential impulse to segmentation. This action alone leaves the egg sickly, so that it dies and disintegrates in a short time. To secure normal development, a second treatment is necessary, apparently to protect or immunize the